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(71)Applicant : INOAC CORPORATION:KK

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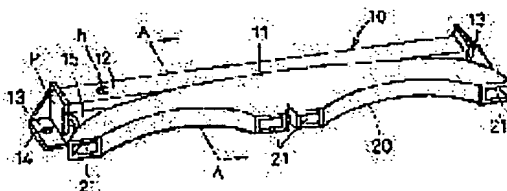
(72)Inventor : HARADA KENTARO

(54) CROSS MEMBER WITH DUCT FOR VEHICLE**(57)Abstract:**

PROBLEM TO BE SOLVED: To provide a light-weight cross member with a duct by integrally and parallel forming a cross member body part composed of a hard resin cylindrical body and a duct part composed of a hard resin cylindrical part and foaming and filling hard foaming body in the cross member body part.

SOLUTION: A cross member 10 with a duct is arranged in the back side of an instrument panel along the car width direction and constituted of a body part 11 and fitting parts 13 in its both sides. The body part 11 connects the cross member body part 12 to a duct part 20 in its side face so as to be parallel integrally formed. The cross member body part 12 is constituted of a hard resin cylindrical body matched with the length in the car width direction.

Polypropylene and fiber reinforced resin are used as the hard resin. Hard foaming body is expanded and filled in the cross member body part 12 from a material filling port (h) to enhance the rigidity. The hard foaming body to be filled is preferably to be a normal temperature hardening type hard polyurethane foaming body from the viewpoint of the formability and rigidity



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Bibliography

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- [71] [Applicant]
- [Identification Number] 000119232
- [Name] INOAKKU, Inc. corporation
- [Address] 2-13-4, Meieki-minami, Nakamura-ku, Nagoya-shi, Aichi-ken
- [72] [Inventor(s)]
- [Name] Harada Kentaro
- [Address] 3-1-36, Imaike-cho, Anjo-shi, Aichi-ken Inside of an INOAKKU, Inc. corporation Anjo place of business
- [74] [Attorney]
- [Patent Attorney]
- [Name] Goto **** (besides one person)

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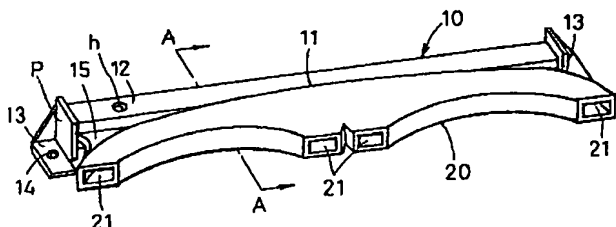
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(57) [Abstract]

[Technical problem] While lightweight-izing a cross member, the cross member with a duct of the car with which installation of a duct does not become complicated is offered.

[Means for Solution] It really comes mutually to fabricate the duct section 20 which is the cross member 10 with a duct prepared in instrument-panel 30 rear face along with the cross direction, and consists of the cross-member body section 12 by which foaming restoration of the hard foam P was carried out into the tube-like object made of rigid resin, and a tube-like object made of rigid resin in juxtaposition.

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CLAIMS

[Claim(s)]

[Claim 1] The cross member with a duct of the car which the duct section which is the cross member with a duct prepared in an instrument-panel background along with the cross direction, and consists of the cross-member body section which consists of a tube-like object made of rigid resin, and a tube-like object made of rigid resin is really fabricated in juxtaposition, and is characterized by carrying out foaming restoration of the hard foam at said cross-member body circles.

[Claim 2] The cross member with a duct of the car characterized by inserting the duct section which is the cross member with a duct prepared in an instrument-panel background along with the cross direction, and becomes the cross-member body circles which consist of a tube-like object made of rigid resin from the tube-like object made of rigid resin, and carrying out foaming restoration of the hard foam between said cross-member body section inside and duct section external surface.

[Claim 3] The cross member with a duct of the car characterized by being divided in claim 2 at two or more paths by the septum by which said duct circles are prolonged in the longitudinal direction.

[Claim 4] The cross member with a duct of the car which it is the cross member with a duct prepared in an instrument-panel background along with the cross direction, and partition formation is carried out at two or more paths by the septum by which the interior of the cross-member body section which consists of a tube-like object made of rigid resin extends in the longitudinal direction, and at least one of said the paths is made into the duct section, and is characterized by carry out foaming restoration of the hard foam at least one of the remaining paths.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the cross member with a duct who was especially united with the duct section about the cross member stationed along with the cross direction on the background of the instrument panel for automobiles.

[0002]

[Description of the Prior Art] As conventionally shown in drawing 9 , along with the longitudinal direction (cross direction), a cross member 31 (called a RIIIN force) is stationed on the background of the instrument panel 30 for automobiles. In order that this cross member 31 may raise the rigidity of a car body to the loads at the time of a collision etc. while being used for the shaft of a handle, or installation of an airbag unit, it is comparatively heavy-gage and the thing of the iron shape of a tube-like object with a large path is used. Therefore, it was heavy, and since an occupancy tooth space became large, it does not agree in lightweight-ization of an automobile in recent years, but the handling at the time of a cross member's 31 attachment activity was also hard to be called fitness from the point of weight etc.

[0003] Moreover, in order [of instrument-panel 30 background] to cross a core mostly, said cross member 31 had complicated installation of ducts (not shown), such as an air-conditioner, and had the fault of having to divide and attach a duct.

[0004]

[Problem(s) to be Solved by the Invention] This invention offers the cross member with a duct to whom installation of a duct does not become complicated while it was made in view of the aforementioned point and lightweight-izes a cross member.

[0005]

[Means for Solving the Problem] That is, invention of claim 1 is a cross member with a duct prepared in an instrument-panel background along with the cross direction, and the duct section which consists of the cross-member body section which consists of a tube-like object made of rigid resin, and a tube-like object made of rigid resin is really fabricated in juxtaposition, and it is characterized by carrying out foaming restoration of the hard foam at said cross-member body circles.

[0006] Invention of claim 2 is a cross member with a duct prepared in an instrument-panel background along with the cross direction, and the duct section which becomes the cross-member body circles which consist of a tube-like object made of rigid resin from the tube-like object made of rigid resin is inserted, and it is characterized by carrying out foaming restoration of the hard foam in the clearance between said cross-member body section inside and duct section external surface.

[0007] Invention of claim 3 is characterized by being divided at two or more paths by the septum by which said duct circles in claim 2 are prolonged in the shaft orientations.

[0008] Moreover, it is the cross member with a duct prepared in an instrument-panel background along with the cross direction, and partition formation is carried out at two or more paths by the septum by which the interior of the cross-member body section which consists of a tube-like object made of rigid resin extends in the shaft orientations, at least one of said the paths is made into the duct section, and invention of claim 4 is characterized by carry out foaming restoration of the hard foam at least one of the remaining paths.

[0009]

[Embodiment of the Invention] According to an attached drawing, this invention is explained to a detail below. The perspective view showing the cross member with a duct whom drawing 1 requires for one example of invention of claim 1, The partial perspective view in which drawing 2 shows the A-A sectional view of drawing 1 , and the example of others [drawing 3], the partial perspective view in which drawing 4 shows other examples, The perspective view showing the cross member with a duct whom drawing 5 requires for one example of invention of claim 2 and claim 3, Drawing in which drawing 6 shows B-B, C-C, and the D-D cross section of drawing 5 , the perspective view showing the cross member with a duct whom drawing 7 requires for one example of invention of claim 4, and drawing 8 are drawings showing E-E of drawing 7 , F-F, and a G-G cross section.

[0010] The cross member with a duct of invention of claim 1 is explained first. The cross member 10 with a

duct who shows drawing 1 is stationed along with the longitudinal direction (cross direction) on the background of the instrument panel 30 shown in drawing 9 , and he consists of the body section 11 and the attachment section 13 of the both ends so that I may be understood also from drawing 2 . The cross-member body section 12 and the duct section 20 join together on the side face, and the body section 11 is really fabricated in juxtaposition.

[0011] Said cross-member body section 12 consists of a tube-like object of proper cross-section configurations, such as a square shape tube-like object made of the rigid resin according to the die length of the cross direction of an instrument panel, a round shape tube-like object like other examples shown in drawing 3 or drawing 4 , or an ellipse that is not illustrated. As rigid resin, proper rigid resin, such as polypropylene and fiber strengthening resin, is used. Into this cross-member body section 12, foaming restoration of the hard foam P is carried out, and rigid increase is achieved. In addition, the cross-member body section 12 is desirable at the point that what closed both ends can raise rigidity more, and the raw material inlet h for hard foam P is established in a part of cross-member body section 12 in that case. Moreover, the attachment section 13 for attaching this cross member 10 in a car body is formed in the both-ends location of this cross-member body section 12 at one. The configuration of this attachment section 13 is made into the proper configuration according to the car body in which a cross member 10 is attached, and is made into the attachment sections 13a and 13b as shown in drawing 3 and drawing 4 other than this example, or another proper configuration. The signs 14, 14a, and 14b of illustration are the screwholes for installation, and 15, 15a, and 15b are the bond parts of the cross-member body section 12 and the duct section 20.

[0012] The hard foam P with which it fills up in said cross-member body section 12 has hard polyurethane foam especially a moldability, and desirable hard polyurethane foam of a room-temperature-setting mold well-known from a rigid point. This hard foam P reinforces the cross-member body section 12, without spoiling the lightweight nature of said cross-member body section 12, from the edge of this cross-member body section 12, a foaming raw material is poured in and foaming of it is carried out. In order that it may be full of a foaming raw material in the cross-member body section 12 at the time of the foaming, it may become hard foam P and cross-member body section 12 inside and hard foam P may carry out adhesion unification with the adhesive property at the time of the foaming, the rigid enhancement effect of the cross-member body section 12 becomes high. When the cross-member body section 12 is what both ends opened at the time of said foaming, a plug etc. closes the both ends and exsorption of a foaming raw material is prevented. In addition, when the quality of the material of the cross-member body section 12 consists of polypropylene etc. and it is inferior to an adhesive property with said hard foam P, it is desirable that priming or flame treatment raises an adhesive property for the inside of the cross-member body section 12 in advance of foaming of hard foam P.

[0013] Moreover, said duct section 20 sends the air which connected with the air compressor which is not illustrated and was air-conditioned to the vehicle interior of a room through diffuser D of the instrument panel 30 of said drawing 9 , and consists of a tube-like object in the air which consists of the same rigid resin as said cross-member body section 12. This duct section 20 is fabricated by said cross-member body section 12 and one, and has combined with said cross-member body section 12 on the side face. A cross member's 10 rigidity is raised by unification of this duct section 20 and the cross-member body section 12. Moreover, this duct section 20 has the openings 21, 21, and 21 for blowdown in the location corresponding to diffuser D of said instrument panel 30, and has opening for entrainments (not shown) into which the air from an air compressor is blown further on the inferior surface of tongue of the duct section 20. In addition, the location of said opening 21 for blowdown and opening for entrainments, a configuration, and a number are suitably determined according to an instrument panel etc.

[0014] Thus, it sets to the becoming cross member 10 with a duct. Since it is reinforced by the hard foam P with which used the tube-like object made of rigid resin for said cross-member body section 12, and the interior was filled up, And since the duct section 20 and the cross-member body section 12 of the tube-like object made of rigid resin join together and are united on the side face, Since it has sufficient rigidity, and it excels in lightweight nature since it is not metal, and it has the duct section 20 in one further, the activity which attaches a separate duct in a car body becomes unnecessary, and it becomes simple working it.

[0015] Next, cross-member 10with duct A concerning the example of invention of claim 2 shown in drawing 5 and drawing 6 and claim 3 is explained. In addition, drawing of (B) of drawing 6 , (C), and (D) corresponds with the sectional view of B-B of drawing 5 , C-C, and D-D, respectively. This cross-member 10with duct A consists of body section 11A and installation section 13A of those both ends.

[0016] Cross-member body section 12A which said body section 11A turns into from a rigid resin nature tube-like object, Duct section 20A which consists of a tube-like object made of rigid resin which left foam space (not shown) between the cross-member body section 12A inside, and was inserted into this cross-member body section 12A, Hard foam P by which foaming restoration was carried out is consisted of by the foam space between said cross-member body section 12A inside and duct section 20 external surface.

[0017] Said cross-member body section 12A consists of the shape of a cartridge of die length almost equal

to breadth of a car, consists of an rectangular pipe which consists of this example with the vertical two-piece-housing object fabricated by injection molding etc., and unifies the division object of those upper and lower sides by adhesives or welding. Moreover, outer case 16A for blowdown connected with said diffuser D of an instrument panel is suitably formed in a location, and outer case 17A for entrainments connected with an air compressor is formed in the external surface at the inferior-surface-of-tongue side. In addition, in the example of illustration, outer case 16A for blowdown prepared in the top face of cross-member body section 12A is used as the pin center, large diffuser of an instrument panel, or a defogger (defroster of a windshield). Moreover, said installation section 13A is formed in the both ends of said cross-member body section 12A at one:

[0018] Said duct section 20A consists of a tube-like object made of rigid resin of a cross-section configuration smaller than the cross-section configuration of cross-member body section 12A, in this example, it consists of rectangular pipes of the vertical two-piece-housing object fabricated by injection molding etc. like cross-member body section 12A, and those both ends are taken up with end-wall 24A. In addition, as for duct section 20A both ends, it is desirable to make it attachment of a plug close, or to form an end face in the both ends of cross-member body section 12A beforehand, and to take up the both ends of cross-member body section 12A. Moreover, container liner 21 for blowdown A and container liner 22A for entrainments which are inserted in outer case 16 for blowdown of said cross-member body section 12A A and outer case 17A for entrainments are projected and formed in the external surface of this duct section 20A. Furthermore, this duct section 20A is divided by septum 23A prolonged in that longitudinal direction (cross direction) at the paths 25A, 25A, and 25A of plurality [interior], and at least one path leads to said container liner 21 for blowdown A, and container liner 22A for entrainments. The rigidity of this cross-member 10A is raised more by said septum 23A. In this example, in order to let air pass to both the paths 25A and 25A at a part of septum 23A which divides said path 25A since container liner 21A for blowdown is formed in the adjacent paths 25A and 25A, respectively, free passage opening 26A is formed.

[0019] Dew condensation with the air at the time of duct section 20A passage is made hard for said hard foam P to consist of hard polyurethane foam by which foaming was carried out from the foaming raw material in the foam space between the inside of cross-member body section 12A, and duct section 20A external surface (not shown), to have pasted it up on a cross-member body section 12A inside and duct section 20A external surface, and to increase the rigidity of cross-member 10A, and to produce. In addition, as for this hard foam P, it is desirable to be filled up also between said outer case 16A for blowdown and container liner 21A and between outer case 17A for entrainments and container liner 22A.

[0020] Subsequently, cross-member 10 with duct B concerning one example of invention of claim 4 shown in drawing 7 and drawing 8 is explained. In addition, the (E) Fig. of drawing 8, the (F) Fig., and the (G) Fig. are equivalent to the E-E sectional view of drawing 7, a F-F sectional view, and a G-G sectional view, respectively. This cross-member 10 with duct B consists of body section 11B and installation section 13B of those both ends like each aforementioned example.

[0021] Body section 11B is divided by two or more paths 25B and 25B and .. by septum 23B to which the interior of cross-member body section 12B which consists of a tube-like object made of rigid resin is set up from the wall, and extends in a longitudinal direction (cross direction). And at least one of the path 25B of the was set to duct section 20B, foaming restoration of the hard foam P was carried out at at least one of the remaining path 25B, and all the desirable remaining paths, and this hard foam P has pasted up with the inside of cross-member body section 12B. In addition, the both ends of duct section 20B are closed by Cap C etc.

[0022] The interior consisted of an rectangular pipe configuration divided by said septum 23B, and was fabricated by the vertical two-piece-housing object with injection molding etc., cross-member body section 12B of this example is constituted, and said installation section 13B which attaches in those both ends and has screw hole 14B of business is formed in one. Moreover, it is projected and formed in the external surface of cross-member body section 12B in the location where the cylinder part 22 for entrainments is connected with said diffuser D and air compressor of said instrument panel as cylinder part 16 for blowdown B which leads in duct section 20B.

[0023] Since the cross-member body section was constituted from hard foam which carried out foaming restoration in a rigid resin nature tube-like object and its interior according to the cross members 10A and 10B with a duct of invention of such a claim 2 thru/or claim 4, weight not only can mitigate sharply, but it has sufficient rigidity. Furthermore, rigidity is increasing more by existence of the septum which divides the duct section. Moreover, since the cross-member part and the duct part for air-conditioning are united, while the man day which attaches each to a car body, components mark required for the attachment, etc. are reducible, an occupancy tooth space can also be made small. Moreover, dew condensation with the air which passes the duct section can also be lessened by said hard foam.

[0024]

[Effect of the Invention] Since according to the cross member with a duct of this invention it can lightweight-ize and the cross-member part and the duct part are further united, holding sufficient rigidity required for a

cross member as it illustrates above and being explained, attachment by the car body becomes easy and it not only can also reduce the components mark which are needed in that case, but can make a monopoly tooth space small.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the cross member with a duct concerning one example of invention of claim 1.

[Drawing 2] It is the A-A sectional view of drawing 1 .

[Drawing 3] It is the partial perspective view showing other examples.

[Drawing 4] It is the partial perspective view showing other examples.

[Drawing 5] It is the perspective view showing the cross member with a duct concerning one example of invention of claim 2 and claim 3.

[Drawing 6] It is drawing showing B-B, C-C, and the D-D cross section of drawing 5 .

[Drawing 7] It is the perspective view showing the cross member with a duct concerning one example of invention of claim 4.

[Drawing 8] It is drawing showing E-E of drawing 7 , F-F, and a G-G cross section.

[Drawing 9] It is this schematic drawing of the instrument panel in which the conventional cross member's installation condition is shown.

[Description of Notations]

10 Cross Member with Duct

12 Cross-Member Section

20 Duct Section

30 Instrument Panel

P Hard foam

[Translation done.]

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(71)出願人 000119232

株式会社イノアックコーポレーション

愛知県名古屋市市中村区名駅南2丁目13番4号

(72)発明者 原田 健太郎

愛知県安城市今池町3-1-36 株式会社
イノアックコーポレーション安城事業所内

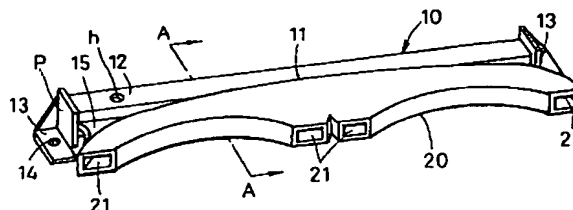
(74)代理人 弁理士 後藤 憲秋 (外1名)

(54)【発明の名称】 車両のダクト付きクロスメンバー

(57)【要約】

【課題】 クロスメンバーを軽量化するとともに、ダクトの取り付けが煩雑になることがない車両のダクト付きクロスメンバーを提供する。

【解決手段】 インストルメントパネル30裏面に車幅方向に沿って設けられるダクト付きクロスメンバー10であって、硬質樹脂製筒状体内に硬質発泡体Pが発泡充填されたクロスメンバー本体部12と硬質樹脂製筒状体からなるダクト部20とを、互いに並列的に一体成形してなる。



【特許請求の範囲】

【請求項 1】 インストルメントパネル裏側に車幅方向に沿って設けられるダクト付きクロスメンバーであって、硬質樹脂製筒状体からなるクロスメンバー本体部と硬質樹脂製筒状体からなるダクト部とが並列的に一体成形され、前記クロスメンバー本体部内に硬質発泡体が発泡充填されていることを特徴とする車両のダクト付きクロスメンバー。

【請求項 2】 インストルメントパネル裏側に車幅方向に沿って設けられるダクト付きクロスメンバーであって、硬質樹脂製筒状体からなるクロスメンバー本体部内に硬質樹脂製筒状体からなるダクト部が挿入され、前記クロスメンバー本体部内面とダクト部外面間に硬質発泡体が発泡充填されていることを特徴とする車両のダクト付きクロスメンバー。

【請求項 3】 請求項 2 において、前記ダクト部内がその長手方向に延びる隔壁で複数の通路に区画されていることを特徴とする車両のダクト付きクロスメンバー。

【請求項 4】 インストルメントパネル裏側に車幅方向に沿って設けられるダクト付きクロスメンバーであって、硬質樹脂製筒状体からなるクロスメンバー本体部の内部がその長手方向に延びる隔壁で複数の通路に区画形成され、前記通路の少なくとも一つがダクト部とされ、残りの通路の少なくとも一つに硬質発泡体が発泡充填されていることを特徴とする車両のダクト付きクロスメンバー。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、自動車用インストルメントパネルの裏側に車幅方向に沿って配置されるクロスメンバーに関し、特にダクト部と一体になったダクト付きクロスメンバーに関する。

【0002】

【従来の技術】従来、図 9 に示すように、自動車用インストルメントパネル 30 の裏側には、その長手方向（車幅方向）に沿ってクロスメンバー 31（リインフォースとも称される）が配置される。このクロスメンバー 31 は、ハンドルのシャフトやエアバッグユニットの取り付けに用いられるとともに、衝突時などの負荷に対して車体の剛性を高めるため、比較的厚肉で径の大きい鉄製の筒状体状のものが用いられている。したがって、重く、占有スペースが大きくなるため、近年の自動車の軽量化に合致せず、クロスメンバー 31 の組み付け作業時の取り扱いも重量の点等から良好とは言い難かった。

【0003】また、前記クロスメンバー 31 はインストルメントパネル 30 裏側のほぼ中心部を横断するため、エアコン等のダクト（図示せず）の取り付けが煩雑で、ダクトを分割して取り付けなければならない等の不具合があった。

【0004】

【発明が解決しようとする課題】この発明は前記の点に鑑みなされたもので、クロスメンバーを軽量化するとともに、ダクトの取り付けが煩雑になることのない、ダクト付きクロスメンバーを提供するものである。

【0005】

【課題を解決するための手段】すなわち、請求項 1 の発明は、インストルメントパネル裏側に車幅方向に沿って設けられるダクト付きクロスメンバーであって、硬質樹脂製筒状体からなるクロスメンバー本体部と硬質樹脂製筒状体からなるダクト部とが並列的に一体成形され、前記クロスメンバー本体部内に硬質発泡体が発泡充填されていることを特徴とする。

【0006】請求項 2 の発明は、インストルメントパネル裏側に車幅方向に沿って設けられるダクト付きクロスメンバーであって、硬質樹脂製筒状体からなるクロスメンバー本体部内に硬質樹脂製筒状体からなるダクト部が挿入され、前記クロスメンバー本体部内面とダクト部外面間の隙間に硬質発泡体が発泡充填されていることを特徴とする。

【0007】請求項 3 の発明は、請求項 2 における前記ダクト部内がその軸方向に延びる隔壁で複数の通路に区画されていることを特徴とする。

【0008】また、請求項 4 の発明は、インストルメントパネル裏側に車幅方向に沿って設けられるダクト付きクロスメンバーであって、硬質樹脂製筒状体からなるクロスメンバー本体部の内部がその軸方向に延びる隔壁で複数の通路に区画形成され、前記通路の少なくとも一つがダクト部とされ、残りの通路の少なくとも一つに硬質発泡体が発泡充填されていることを特徴とする。

【0009】

【発明の実施の形態】以下添付の図面に従ってこの発明を詳細に説明する。図 1 は請求項 1 の発明の一実施例に係るダクト付きクロスメンバーを示す斜視図、図 2 は図 1 の A-A 断面図、図 3 は他の例を示す部分斜視図、図 4 はその他の例を示す部分斜視図、図 5 は請求項 2 および請求項 3 の発明の一実施例に係るダクト付きクロスメンバーを示す斜視図、図 6 は図 5 の B-B、C-C および D-D 断面を示す図、図 7 は請求項 4 の発明の一実施例に係るダクト付きクロスメンバーを示す斜視図、図 8 は図 7 の E-E、F-F、G-G 断面を示す図である。

【0010】まず請求項 1 の発明のダクト付きクロスメンバーについて説明する。図 1 に示すダクト付きクロスメンバー 10 は、図 9 に示したインストルメントパネル 30 の裏側にその長手方向（車幅方向）に沿って配置されるもので、図 2 から理解されるように、本体部 11 とその両端の取付部 13 とよりなる。本体部 11 は、クロスメンバー本体部 12 とダクト部 20 がその側面で結合して並列的に一体成形されている。

【0011】前記クロスメンバー本体部 12 は、インストルメントパネルの車幅方向の長さに応じた硬質樹脂製

の角形筒状体、もしくは図3や図4に示す他の例のような丸形筒状体、または図示しない楕円等適宜の横断面形状の筒状体よりなる。硬質樹脂としては、ポリプロピレンや繊維強化樹脂等適宜の硬質樹脂が用いられる。このクロスメンバー本体部12内には硬質発泡体Pが発泡充填されて剛性の増大が図られている。なお、クロスメンバー本体部12は、両端を閉じたものが剛性をより高めることができる点で好ましく、その場合には、クロスメンバー本体部12の一部に硬質発泡体Pのための原料注入口hが設けられる。また、このクロスメンバー本体部12の両端位置には該クロスメンバー10を車体へ取り付けるための取付部13が一体に形成されている。この取付部13の形状は、クロスメンバー10が取り付けられる車体に応じた適宜の形状とされ、この例の他に、図3や図4に示すような取付部13a、13b、あるいはその他適宜形状とされる。図示の符号14、14a、14bは取り付け用のネジ孔、また15、15a、15bはクロスメンバー本体部12とダクト部20との結合部である。

【0012】前記クロスメンバー本体部12内に充填される硬質発泡体Pは、硬質ポリウレタン発泡体、特に成形性および剛性の点から公知の常温硬化型の硬質ポリウレタン発泡体が好ましい。この硬質発泡体Pは、前記クロスメンバー本体部12の軽量性を損なうことなくクロスメンバー本体部12を補強するもので、該クロスメンバー本体部12の端部から発泡原料が注入されて発泡成形されている。その発泡成形時、発泡原料はクロスメンバー本体部12内に充満して硬質発泡体Pとなり、その発泡時の接着性によりクロスメンバー本体部12内面と硬質発泡体Pが接着一体化するため、クロスメンバー本体部12の剛性増大効果が高くなる。前記発泡時、クロスメンバー本体部12が両端の開いたもの場合には、その両端を栓等で塞いで発泡原料の漏出を防止する。なお、クロスメンバー本体部12の材質がポリプロピレン等からなると、前記硬質発泡体Pとの接着性に劣る場合には、硬質発泡体Pの発泡成形に先立って、クロスメンバー本体部12の内面をプライマー処理あるいは火炎処理等により接着性を高めておくのが好ましい。

【0013】また、前記ダクト部20は、図示しないエアコンプレッサーと連結して空調されたエアを前記図9のインストルメントパネル30の吹き出し口Dを介して車室内に送るもので、前記クロスメンバー本体部12と同様の硬質樹脂よりなる中空の筒状体からなる。該ダクト部20は前記クロスメンバー本体部12と一体に形成されており、側面で前記クロスメンバー本体部12と結合している。このダクト部20とクロスメンバー本体部12の一体化によってもクロスメンバー10の剛性が高められる。また、このダクト部20は、前記インストルメントパネル30の吹き出し口Dに対応する位置に吹き出し用開口21、21、21を有し、さらにはエアコン

プレッサーからの空気が吹き込まれる吹き込み用開口（図示せず）をダクト部20の下面に有する。なお、前記吹き出し用開口21および吹き込み用開口の位置、形状、数はインストルメントパネル等に応じて適宜決定される。

【0014】このようにしてなるダクト付きクロスメンバー10においては、前記クロスメンバー本体部12に硬質樹脂製筒状体を用い、その内部に充填された硬質発泡体Pによって補強されているため、および硬質樹脂製筒状体のダクト部20とクロスメンバー本体部12が側面で結合して一体となっているため、十分な剛性を有し、かつ金属製でないため軽量性に優れ、さらにはダクト部20を一体に有するため、別個のダクトを車体に取り付ける作業が必要なくなり、作業が簡略となる。

【0015】次に、図5および図6に示す請求項2および請求項3の発明の実施例に係るダクト付きクロスメンバー10Aについて説明する。なお、図6の(B)、(C)、(D)の図はそれぞれ図5のB-B、C-C、D-Dの断面図と対応するものである。このダクト付きクロスメンバー10Aは、本体部11Aとその両端の取り付け部13Aとよりなる。

【0016】前記本体部11Aは、硬質樹脂性筒状体からなるクロスメンバー本体部12Aと、そのクロスメンバー本体部12A内面との間に発泡体空間（図示せず）を残して該クロスメンバー本体部12A内に挿入された硬質樹脂製筒状体からなるダクト部20Aと、前記クロスメンバー本体部12A内面とダクト部20外面間の発泡体空間に発泡充填された硬質発泡体Pとで構成される。

【0017】前記クロスメンバー本体部12Aは、ほぼ車幅に等しい長さの筒形状からなり、この例では射出成形等により成形された上下二分割体で構成される角筒からなり、その上下の分割体を接着剤、または融着により一体化したものである。またその外面には、インストルメントパネルの前記吹き出し口Dに繋がる吹き出し用外筒16Aが適宜位置に形成され、また、下面側にはエアコンプレッサーと繋がる吹き込み用外筒17Aが形成されている。なお、図示の例において、クロスメンバー本体部12Aの上面に設けられた吹き出し用外筒16Aはインストルメントパネルのセンター吹き出し口、若しくはデフォッガー（フロントガラスの霜取り）として用いられるものである。また、前記クロスメンバー本体部12Aの両端には前記取り付け部13Aが一体に形成されている。

【0018】前記ダクト部20Aは、クロスメンバー本体部12Aの横断面形状より小さな横断面形状の硬質樹脂製筒状体からなり、この例ではクロスメンバー本体部12Aと同様に射出成形等により成形された上下二分割体の角筒で構成され、その両端が端壁24Aにより塞がれている。なお、ダクト部20A両端は栓の嵌着によ

て塞ぐようにしたり、あらかじめクロスメンバー本体部12Aの両端に端面を形成してクロスメンバー本体部12Aの両端を塞ぐのが好ましい。また、このダクト部20Aの外面には、前記クロスメンバー本体部12Aの吹き出し用外筒16Aおよび吹き込み用外筒17Aに挿通される吹き出し用内筒21Aおよび吹き込み用内筒22Aが突出形成されている。さらに、このダクト部20Aは、その長手方向（車幅方向）に延びる隔壁23Aによって、内部が複数の通路25A、25A、25Aに区画され、少なくとも一つの通路が前記吹き出し用内筒21Aおよび吹き込み用内筒22Aと通じている。前記隔壁23Aによって、このクロスメンバー10Aの剛性がより高められている。この例においては、隣り合う通路25A、25Aにそれぞれ吹き出し用内筒21Aが形成されているため、前記通路25Aを区画する隔壁23Aの一部には両通路25A、25Aに空気を通すため連通開口部26Aが形成されている。

【0019】前記硬質発泡体Pは、クロスメンバー本体部12Aの内面とダクト部20A外面間の発泡体空間（図示せず）において発泡原料から発泡成形された硬質ポリウレタン発泡体等からなるもので、クロスメンバー本体部12A内面とダクト部20A外面に接着しており、クロスメンバー10Aの剛性を増大させ、またダクト部20A通過時の空気による結露を生じにくくする。なお、この硬質発泡体Pは、前記吹き出し用外筒16Aと内筒21A間および吹き込み用外筒17Aと内筒22A間にも充填するのが好ましい。

【0020】次いで、図7および図8に示す請求項4の発明の一実施例に係るダクト付きクロスメンバー10Bについて説明する。なお、図8の（E）図、（F）図、（G）図はそれぞれ図7のE-E断面図、F-F断面図、G-G断面図に対応する。このダクト付きクロスメンバー10Bは、前記の各実施例と同様に本体部11Bとその両端の取り付け部13Bとよりなる。

【0021】本体部11Bは、硬質樹脂製筒状体よりなるクロスメンバー本体部12Bの内部が、その内壁から立設されて長手方向（車幅方向）に延びる隔壁23Bにより複数の通路25B、25B、...に区画されている。そして、その通路25Bの少なくとも一つがダクト部20Bとされ、残りの通路25Bの少なくとも一つ、好ましくは残りの通路全てに硬質発泡体Pが発泡充填され、該硬質発泡体Pがクロスメンバー本体部12Bの内面と接着している。なお、ダクト部20Bの両端はキャップC等により塞がれている。

【0022】この例のクロスメンバー本体部12Bは、内部が前記隔壁23Bによって区画された角筒形状からなり、射出成形等によって上下二分割体に成形されたもので構成され、その両端に取り付け用のネジ孔14Bを

有する前記取り付け部13Bが一体に形成されている。また、クロスメンバー本体部12Bの外面にはダクト部20B内と通じる吹き出し用筒部16Bと吹き込み用筒部22が、前記インストルメントパネルの前記吹き出し口Dとエアコンプレッサーに繋がる位置に突出形成されている。

【0023】このような請求項2ないし請求項4の発明のダクト付きクロスメンバー10A、10Bによれば、クロスメンバー本体部を硬質樹脂性筒状体およびその内部に発泡充填した硬質発泡体で構成したため、重量が大幅に軽減できるのみならず、十分な剛性を有する。さらに、ダクト部を区画する隔壁の存在によって剛性がより高まっている。また、クロスメンバー部分と空調用のダクト部分が一体となっているため、それぞれを車体に組み付ける工数、およびその組付けに必要な部品点数等を削減することができるとともに、占有スペースも小さくできる。また、ダクト部を通過する空気による結露も前記硬質発泡体により少なくすることができる。

【0024】

【発明の効果】以上図示し説明したように、この発明のダクト付きクロスメンバーによれば、クロスメンバーに必要な十分な剛性を保持しつつ軽量化することができ、さらにはクロスメンバー部分とダクト部分が一体になっているため、車体への組み付けが簡単になり、その際に必要となる部品点数も削減することができるのみならず、専有スペースを小さくすることができる。

【図面の簡単な説明】

【図1】請求項1の発明の一実施例に係るダクト付きクロスメンバーを示す斜視図である。

【図2】図1のA-A断面図である。

【図3】他の例を示す部分斜視図である。

【図4】その他の例を示す部分斜視図である。

【図5】請求項2および請求項3の発明の一実施例に係るダクト付きクロスメンバーを示す斜視図である。

【図6】図5のB-B、C-CおよびD-D断面を示す図である。

【図7】請求項4の発明の一実施例に係るダクト付きクロスメンバーを示す斜視図である。

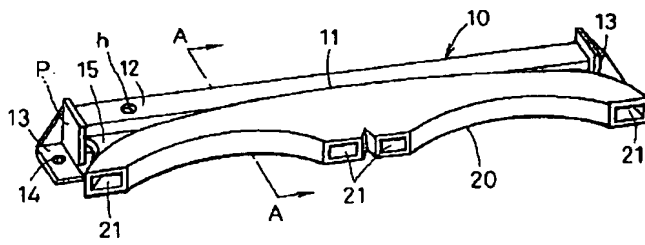
【図8】図7のE-E、F-F、G-G断面を示す図である。

【図9】従来のクロスメンバーの取り付け状態を示すインストルメントパネルの該略図である。

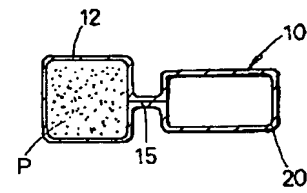
【符号の説明】

- 10 ダクト付きクロスメンバー
- 12 クロスメンバー部
- 20 ダクト部
- 30 インストルメントパネル
- P 硬質発泡体

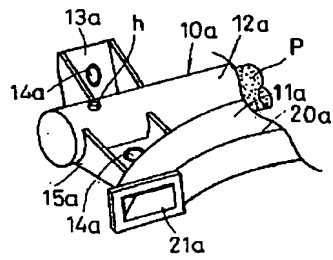
【図1】



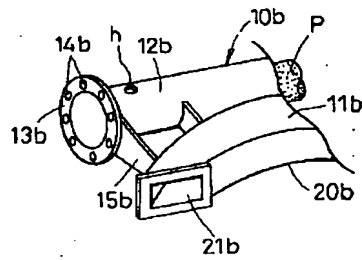
【図2】



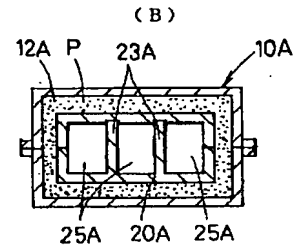
【図3】



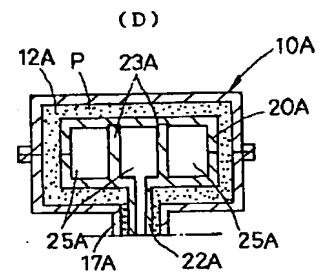
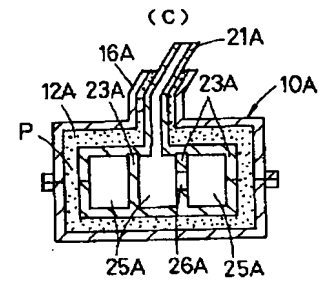
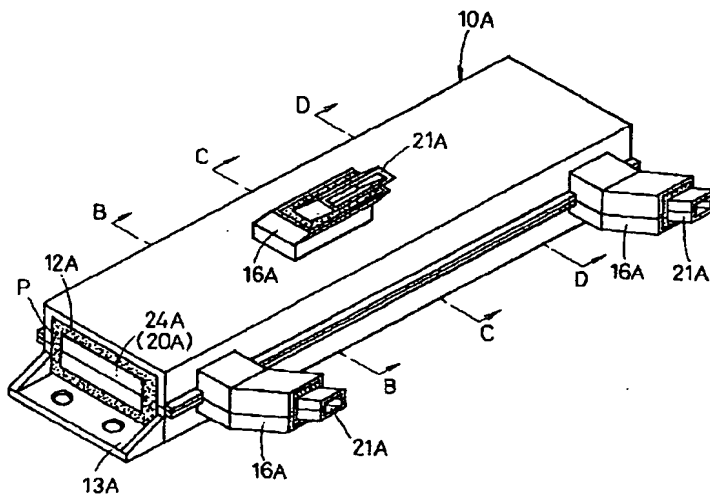
【図4】



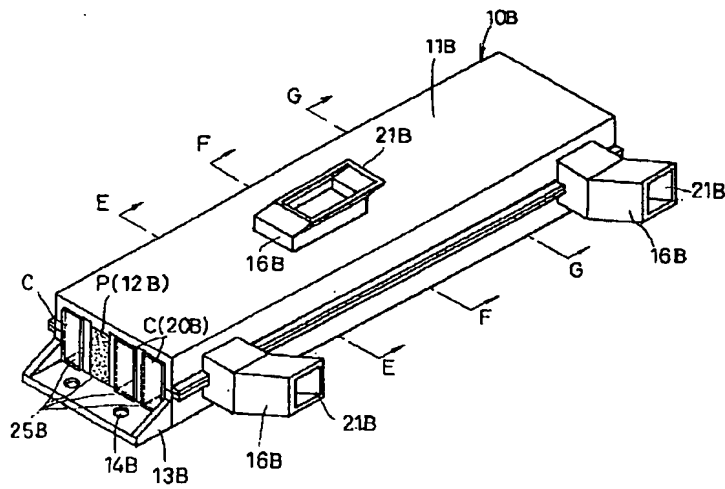
【図6】



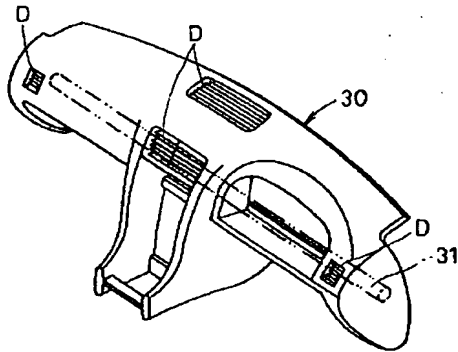
【図5】



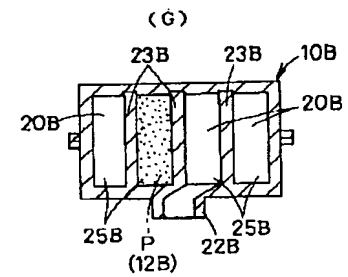
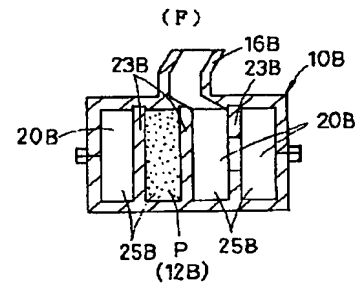
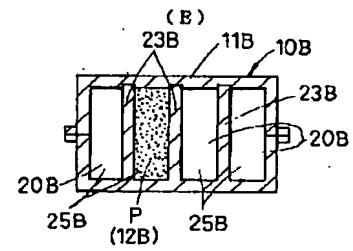
【図7】



【図9】



【図8】



フロントページの続き

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